

Claims

1. A planar antenna structure for a radio device having at least one operating band and comprising a ground plane, radiating element, feed element, feed circuit and an antenna port, wherein
 - 5 - the radiating element is galvanically isolated from other conductive parts of the radio device,
 - there is an electromagnetic coupling between the radiating element and feed element to transfer transmitting energy to field of the radiating element and receiving energy to field of the feed element, and
 - 10 - the feed circuit is reactive and it connects an antenna feed point in the feed element to the antenna port and ground plane in order to set said at least one operating band to a desired range on the frequency axis and to match the antenna.
2. A planar antenna structure according to claim 1, comprising a feed circuit board between the feed element and ground plane.
- 15 3. A planar antenna structure according to claim 2, wherein, to provide two separate operating bands, there is in the feed circuit board a feed conductor which galvanically connects said feed point to the antenna port, and a ground conductor which electromagnetically connects the feed conductor to the ground plane at an intermediate point in the feed conductor.
- 20 4. A planar antenna structure according to claim 3, the feed conductor and ground conductor being meandering strip conductors, which have certain inductances.
5. A planar antenna structure according to claim 1, wherein the radiating element, when installed, follows the contours of the outer surface of the radio
 - 25 device as regards its shape and position.
6. A planar antenna structure according to claim 5, the radiating element being a rigid conductive piece belonging to a cover of the radio device.
7. A planar antenna structure according to claim 6, said conductive piece being an extrusion piece.
- 30 8. A planar antenna structure according to claim 1, comprising a dielectric layer above the ground plane with a radiating element on one surface of said layer and a feed element on the opposing surface thereof.

9. A planar antenna structure according to claim 8, wherein a plate formed by said dielectric layer, radiating element and feed element is arranged to be attached to an inner surface of a non-conductive cover of the radio device.
- 5 10. A planar antenna structure according to claim 5, the radiating element being a conductive layer on an outer surface of the cover of the radio device, and the feed element being a conductive layer on an inner surface of the cover of the radio device.
11. A planar antenna structure according to claim 5, at least one of the radiating element and feed element being located inside the cover of the radio device.
- 10 12. A planar antenna structure according to claim 1, further comprising at least one radiating parasitic element.
13. A radio device comprising a planar antenna structure, which has at least one operating band and comprises a ground plane, radiating element, feed element, feed circuit and an antenna port, wherein
- 15 - the radiating element is galvanically isolated from the other conductive parts of the radio device,
- there is an electromagnetic coupling between the radiating element and feed element to transfer transmitting energy to the field of the radiating element and receiving energy to the field of the feed element, and
- 20 - the feed circuit is reactive and it connects an antenna feed point in the feed element to the antenna port and ground plane in order to set said at least one operating band to a desired range on the frequency axis and to match the antenna.